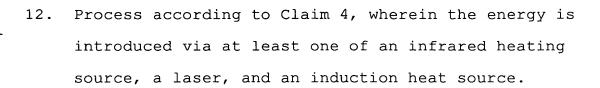
## WHAT IS CLAIMED IS:

Process for producing a surface layer with embedded intermetallic phases, the process comprising the acts of:

- applying a layer comprising a metal and a ceramic to a substrate element,
- causing a reaction to take place between the metal and the ceramic of the layer as a result of energy being introduced during the application of the layer or as a result of a subsequent introduction of energy, and
- producing a resultant surface layer having intermetallic phases being formed.
- Process according to Claim 1, wherein the metal of the layer is one of aluminium and an aluminium alloy.
- 3. Process according to Claim 1, wherein the ceramic of the layer is an oxide ceramic.
- 4. Process according to Claim 2, wherein the ceramic of the layer is an oxide ceramic.
- 5. Process according to Claim 1, wherein the layer is applied via one of a thermal spraying process, a slip technique, or a painting technique.

- 6. Process according to Claim 2, wherein the layer is applied via one of a thermal spraying process, a slip technique, or a painting technique.
- 7. Process according to Claim 3, wherein the layer is applied via one of a thermal spraying process, a slip technique, or a painting technique.
- 8. Process according to Claim 4, wherein the layer is applied via one of a thermal spraying process, a slip technique, or a painting technique.
- 9. Process according to Claim 1, wherein the energy is introduced via at least one of an infrared heating source, a laser, and an induction heat source.
- 10. Process according to Claim 2, wherein the energy is introduced via at least one of an infrared heating source, a laser, and an induction heat source.
- 11. Process according to Claim 3, wherein the energy is introduced via at least one of an infrared heating source, a laser, and an induction heat source.



- 13. Process according to Claim 5, wherein the energy is introduced via at least one of an infrared heating source, a laser, and an induction heat source.
- 14. Process according to Claim 6, wherein the energy is introduced via at least one of an infrared heating source, a laser, and an induction heat source.
- 15. Process according to Claim 7, wherein the energy is introduced via at least one of an infrared heating source, a laser, and an induction heat source.
- 16. Process according to Claim 8, wherein the energy is introduced via at least one of an infrared heating source, a laser, and an induction heat source.

A process for producing a surface layer with embedded intermetallic phases, the process comprising:

- (a) applying a layer to a substrate, the layer comprising a metal and a ceramic;
- (b) introducing energy to react the metal and the ceramic such that a resulting surface layer is formed with inter-metallic phases.
- 18. The process of claim 17, wherein the energy is introduced simultaneously with the application of the layer.
  - 19. The process of claim 17, wherein the energy is introduced subsequent to the application of the layer.
  - 20. The process of Claim 17, wherein the metal is selected from the group consisting of aluminium and aluminium alloy.
  - 21. The process of Claim 17, wherein the ceramic is an oxide ceramic.